We claim::

1.   A method of seeding an image, the image comprising a plurality of pixels, wherein said method comprises the step of:

5   distributing seeds in areas of said image as a function of a property of said pixels within those areas, wherein fewer seeds are allocated to those areas of the image having pixels homogeneous in said property.

2.   A method as claimed in claim 1, wherein said distribution step comprises the sub-
10   steps of:

dividing the image into a plurality of areas;

allocating, for each divided area, one or more seeds as a function of said property within the divided area and the size of the divided area as compared to the size of the image; and

15   storing the locations of each allocated seed.

3.   A method as claimed in claim 1, wherein said distribution step comprises the sub-steps of:

selecting the image or a previously divided area of the image as the current area;

20   seeding the center of said current area when a difference between a maximum and minimum value of said property within the current area is less than a first predetermined threshold;

subdividing said current area when said size of said current area is greater than a second predetermined threshold and said difference is greater than or equal to said first

25   predetermined threshold;

uniformly seeding said current area in a low density manner when said size of said area is less than or equal to said second predetermined threshold and said difference is greater than or equal to said first predetermined threshold and less than a third predetermined threshold;

30   subdividing said current area when said size of said area is greater than a fourth predetermined threshold and less than or equal to said second predetermined threshold and said difference is greater than or equal to said third predetermined threshold;

uniformly seeding said current area in a high density manner when said size of said

area is less than or equal to a fourth predetermined threshold and said difference is greater than or equal to said third predetermined threshold; and

repeating the sub-steps of the distribution step until all of said divided areas are seeded.

4. A method as claimed in claim 3, wherein said subdividing steps comprise subdividing said current area into four areas.

5. A method as claimed in claim 1, wherein said property of the pixels is luminance.

6. A method of seeding an image having a plurality of pixels, the method comprising the steps of:

dividing the image into one or more regions;

allocating, for each region, one or more seeds as a function of the contrast of said pixels within the region and the size of the region as compared to the size of the image, wherein fewer seeds are allocated to those regions of the image having pixels of homogeneous contrast; and

storing the pixel locations of each allocated seed.

7. A method as claimed in claim 6, wherein said allocation step comprises the sub-steps of:

selecting the image or a previously divided area of the image as the current area;

seeding the center of said current area when said contrast within the current area is less than a first predetermined threshold;

subdividing said current area when said size of said current area is greater than a second predetermined threshold and said contrast is greater than or equal to said first predetermined threshold;

uniformly seeding said current area in a low density manner when said size of said area is less than or equal to said second predetermined threshold and said contrast is greater than or equal to said first predetermined threshold and less than a third predetermined threshold;

subdividing said current area when said size of said area is greater than a fourth predetermined threshold and less than or equal to said second predetermined threshold and said contrast is greater than or equal to said third predetermined threshold;

uniformly seeding said current area in a high density manner when said size of said area is less than or equal to a fourth predetermined threshold and said contrast is greater than or equal to said third predetermined threshold; and

repeating the sub-steps of the distribution step until all of said divided areas are seeded.

8.   A method as claimed in claim 7, wherein said subdividing steps comprise subdividing said current area into four areas.

9.   A method of seeding an image comprising a plurality of pixels, wherein said method comprises the steps of:

selecting the image or a previously divided area of the image as the current area;

seeding the center of said current area when the contrast of the pixels and the size of current area meet a first predetermined condition;

subdividing said current area when the contrast of the pixels and the size of current area meet a second predetermined condition;

uniformly seeding said current area in a low density manner when the contrast of the pixels and the size of current area meet a third predetermined condition;

subdividing said current area when contrast of the pixels and the size of current area meet a fourth predetermined condition;

uniformly seeding said current area in a high density manner when the contrast of the pixels and the size of current area meet a fifth predetermined condition; and

repeating the selecting and seeding steps until all of said divided areas are seeded, wherein fewer seeds are allocated to those areas of the image having homogeneous contrast.

10.   A method of segmenting an image, the image comprising a plurality of pixels, wherein said method comprises the steps of:

allocating one or more pixels as seeds;

growing regions from said seeds so as to segment the image into a number of regions, wherein a number of pixels that border said growing regions are considered and that pixel of said number that is most similar in a property to a region it borders is appended to that region and the said property of the appended region is updated and said growing step is repeated until no pixels bordering the growing regions are available.

11.   A method as claimed in claim 10, wherein said property of said pixels is luminance.

12.   A method as claimed in claim 10, wherein said growing step comprises the sub-steps of:

generating a list of pixels that border the growing regions;

scanning a said number of said list of pixels in a predetermined manner;

determining a value, for each said scanned pixel, indicative of the similarity of a said property of said scanned pixel and the corresponding said property of a growing region that said scanned pixel borders;

selecting a pixel that has a minimum said value;

appending said selected pixel to said region it borders;

updating the corresponding said property of the appended region; and

repeating the sub-steps of the growing step until the image is segmented.

13.   A method as claimed in claim 12, wherein said selection step selects the first scanned pixel having a said value below a minimum threshold.

14.   A method as claimed in claim 12, wherein said selection step selects a pixel having a said value which is the minimum of all said scanned pixels.

15.   A method as claimed in claim 10, wherein said property is the grey-value of said pixels.

16.   A method as claimed in claim 12, wherein said value is determined in accordance with the following:

$$\delta(x) = \left| g(x) - \underset{y \in A_{i(x)}}{mean}[g(y)] \right|,$$

where $g(x)$ is the grey value of the image point x adjoining region $A_i(x)$ and $g(y)$ is the grey value of the image point y within region $A_i(x)$.

17.   A method as claimed in claim 12, wherein said value is determined in accordance with a metric in color space.

18.   A method as claimed in claim 10, wherein the method further comprises a step of merging said grown regions which have similarilities.

19.   A method as claimed in claim 10, wherein said merging step comprises the sub-steps of:

determining for each pair of neighboring grown regions a clique function value representative of the similarity of said property of said pair of neighboring grown regions;

selecting the pair of grown regions with the smallest clique function value;

merging both said selected regions to produce a merged region and updating the merged region's clique functions with neighboring regions, if said smallest clique function value is less than a predetermined threshold;

repeating the sub-steps of the merging step until said smallest clique function value is greater than or equal to said threshold.

20.   A method of segmenting an image, the image comprising a plurality of pixels, wherein said method comprises the steps of:

allocating one or more pixels as seeds in the image;

growing regions of pixels from said seeds, wherein said growing step comprises the sub-steps of:

generating a list of pixels that border the growing regions;

scanning a number of said pixels of the list;

determining, for each said scanned pixel, a value indicative of the similarity of the luminance of said scanned pixel and the corresponding luminance of a growing region that said scanned pixel borders;

selecting a pixel that has a minimum said value;

appending said selected pixel to said growing region it borders;

updating the said corresponding luminace of the appended region;

repeating the sub-steps of the growing step until there are no more pixels that border the growing regions.

21.   A method as claimed in claim 20, wherein said selection step selects the first scanned pixel having a said value below a minimum threshold.

22.   A method as claimed in claim 20, wherein said selection step selects a pixel having a said value which is the mimimum of all said scanned pixels.

23.   A method as claimed in claim 20, wherein said value is determined in accordance with the following:

$$\delta(x) = \left| g(x) - \underset{y \in A_i(x)}{mean}[g(y)] \right|,$$

where $g(x)$ is the grey value of the image point x adjoining region $A_i(x)$ and $g(y)$ is the grey value of the image point y within region $A_i(x)$.

24.   A method as claimed in claim 20, wherein the method further comprises the step of:

(c) merging neighbouring grown regions to produce a merged region if their similarity is less than a predetermined threshold.

25.   A method of encoding an image having a number of segmented regions, the method comprising the steps of:

splitting said image into a plurality of rectangular areas, wherein each rectangular area comprises a said region or part thereof forming a dominant portion of the rectangular area;

merging said rectangular areas which have a common said dominant portion and share a common edge; and

outputting the vertices of the merged rectangular areas as a representation of the segmented image.

26.   A method as claimed in claim 25, wherein a said region or part thereof within a said rectangular area forms a dominant portion if the size of said region or part thereof within said rectangular area divided by the size of the rectangular area is greater than a predetermined threshold.

27.   A method as claimed in claim 26, wherein said predetermined threshold is 0.95.

28.   A method as claimed in claim 25, wherein said rectangular areas include one or more equilateral rectangular areas.

29. A method as claimed in claim 25, wherein said splitting step comprises:

storing the segmented image in a queue;

performing the following sub-steps until said queue is empty;

removing and selecting the segmented image or a previously divided rectangular area of said segmented image currently stored first in the queue as the current rectangular area;

computing a value representative of the size of said dominant portion within said current area divided by the size of said current area;

storing the co-ordinates of the current area, if said value is greater than a predetermined threshold, otherwise;

splitting said current area into a plurality of rectangular areas and adding the said plurality of rectangular areas to the queue.

30. A method of segmenting an image, the image comprising a plurality of pixels and the method comprising the steps of:

allocating one or more pixels as seeds;

growing regions from said seeds so as to segment the image into a number of regions;

storing the segmented image in a queue;

performing the following sub-steps until said queue is empty;

removing and selecting the segmented image or a previously divided rectangular area of said segmented image currently stored first in the queue as the current rectangular area;

computing a value representative of the size of a dominant segmented region within said current area divided by the size of said current area;

storing the co-ordinates of the current area, if said value is greater than a predetermined threshold, otherwise;

dividing said current area into a plurality of rectangular areas and adding the said plurality of rectangular areas to the queue;

merging said divided rectangular areas which have a common dominant region and share a common edge; and

outputting the vertices of the merged rectangular areas as a representation of the segmented image.

31. A method as claimed in claim 30, wherein said performing step further comprises the sub-steps of:

storing the co-ordinates of the current area, if said size of the current area is less than a predetermined size.

32. A method as claimed in claim 30, wherein said rectangular areas comprise one or more equilateral rectangular areas.

33. A method as claimed in claim 30, wherein said dividing sub-step comprises dividing the current area into four rectangular areas.

34. A method as claimed in claim 30, wherein said predetermined threshold is 0.95.

35. A method of segmenting an image, the image comprising a plurality of pixels, wherein said method comprises the steps of:

distributing seeds in areas of said image as a function of a property of said pixels within those areas, wherein fewer seeds are allocated to those areas of the image having pixels homogeneous in said property; and

growing regions from said seeds so as to segment the image into a number of regions, wherein a number of pixels that border said growing regions are considered and that pixel of said number that is most similar in said property to a region it borders is appended to that region and the said property of the appended region is updated and said growing step is repeated until no pixels bordering the growing regions are available.

36. A method as claimed in claim 35, wherein said distribution step comprises the sub-steps of:

dividing the image into a plurality of areas;

allocating, for each divided area, one or more seeds as a function of said property within the divided area and the size of the divided area as compared to the size of the image; and

storing the locations of each allocated seed.

37. A method as claimed in claim 36, wherein said distribution step comprises the sub-steps of:

selecting the image or a previously divided area of the image as the current area;

seeding the center of said current area when the difference between the maximum and minimum values of said property of the pixels within the current area is less than a first predetermined threshold;

subdividing said current area when said size of said current area is greater than a second predetermined threshold and said difference is greater than or equal to said first predetermined threshold;

uniformly seeding said current area in a low density manner when said size of said area is less than or equal to said second predetermined threshold and said difference is greater than or equal to said first predetermined threshold and less than a third predetermined threshold;

subdividing said current area when said size of said area is greater than a fourth predetermined threshold and less than or equal to said second predetermined threshold and said difference is greater than or equal to said third predetermined threshold;

uniformly seeding said current area in a high density manner when said size of said area is less than or equal to a fourth predetermined threshold and said difference is greater than or equal to said third predetermined threshold; and

repeating the sub-steps of the distribution step until all of said divided areas are seeded.

38. A method as claimed in claim 37, wherein said subdividing steps comprise subdividing said current area into four areas.

39. A method as claimed in claim 35, wherein said property of said pixels is luminance.

40. A method as claimed in claim 35, wherein said growing step comprises the sub-steps of:

generating a list of pixels that border the growing regions;

scanning a said number of said list of pixels in a predetermined manner;

determining a value, for each said scanned pixel, indicative of the similarity of a said property of said scanned pixel and the corresponding said property of a growing region that said scanned pixel borders;

selecting a pixel that has a minimum said value;

appending said selected pixel to said region it borders;

updating the corresponding said property of the appended region; and

repeating the sub-steps of the growing step until the image is segmented.

41. A method as claimed in claim 40, wherein said selection step selects the first scanned pixel having a said value below a minimum threshold.

42. A method as claimed in claim 40, wherein said selection step selects a pixel having a said value which is the minimum of all said scanned pixels.

43. A method as claimed in claim 35, wherein the method further comprises a step of merging said grown regions which have similarities.

44. A method as claimed in claim 35, wherein the method further comprises the steps of:

splitting said image into a plurality of rectangular areas, wherein each rectangular area comprises a said region or part thereof forming a dominant portion of the rectangular area;

merging said rectangular areas which have a common said dominant portion and share a common edge; and

outputting the vertices of the merged rectangular areas as a representation of the segmented image.

45. A method as claimed in claim 43, wherein said merging step comprises the sub-steps of:

determining for each pair of neighboring grown regions a clique function value representative of the similarity of said property of said pair of neighboring grown regions;

selecting the pair of grown regions with the smallest clique function value;

merging both said selected regions to produce a merged region and updating the merged region's clique functions with neighboring regions, if said smallest clique function value is less than a predetermined threshold;

repeating the sub-steps of the merging step until said smallest clique function value is greater than or equal to said threshold.

46.   A method of segmenting an image, the image comprising a plurality of pixels, wherein said method comprises the steps of:

(a) allocating pixels as seeds in areas of the image as a function of the luminance of the pixels within those areas, wherein fewer seeds are allocated to those areas of the image having pixels of homogeneous luminance and wherein said seeds form growing regions;

(b) generating a list of pixels that border the growing regions;

(c) scanning a number of said pixels of the list;

(d) determining, for each said scanned pixel, a value indicative of the similarity of the luminance of said scanned pixel and the corresponding luminance of a growing region that said scanned pixel borders;

(e) selecting a pixel that has a minimum said value;

(f) appending said selected pixel to said growing region it borders;

(g) updating the said corresponding luminace of the appended region;

(h) repeating the sub-steps (b) to (g) until there are no more pixels that border the growing regions.

47.   A method as claimed in claim 46, wherein the the method further comprises the step of:

(i) merging neighbouring grown regions to produce a merged region if their similarity is less than a predetermined threshold.

48.   Apparatus for seeding an image, the image comprising a plurality of pixels, wherein said apparatus comprises:

means for distributing seeds in areas of said image as a function of a property of said pixels within those areas, wherein fewer seeds are allocated to those areas of the image having pixels homogeneous in said property.

49.   Apparatus for seeding an image having a plurality of pixels, the apparatus comprising:

means for dividing the image into one or more regions;

means for allocating, for each region, one or more seeds as a function of the contrast of said pixels within the region and the size of the region as compared to the size

of the image, wherein fewer seeds are allocated to those regions of the image having pixels of homogeneous contrast; and

means for storing the pixel locations of each allocated seed.

50. Apparatus for seeding an image comprising a plurality of pixels, wherein said apparatus comprises:

means for selecting the image or a previously divided area of the image as the current area;

means for seeding the center of said current area when the contrast of the pixels and the size of current area meet a first predetermined condition;

means for subdividing said current area when the contrast of the pixels and the size of current area meet a second predetermined condition;

means for uniformly seeding said current area in a low density manner when the contrast of the pixels and the size of current area meet a third predetermined condition;

means for subdividing said current area when contrast of the pixels and the size of current area meet a fourth predetermined condition;

means for uniformly seeding said current area in a high density manner when the contrast of the pixels and the size of current area meet a fifth predetermined condition; and

means for repeating the operations of the selection and seeding means until all of said divided areas are seeded, wherein fewer seeds are allocated to those areas of the image having homogeneous contrast.

51. Apparatus for segmenting an image, the image comprising a plurality of pixels, wherein said apparatus comprises:

means for allocating one or more pixels as seeds;

means for growing regions from said seeds so as to segment the image into a number of regions, wherein a number of pixels that border said growing regions are considered and that pixel of said number that is most similar in a property to a region it borders is appended to that region and the said property of the appended region is updated and said growing step is repeated until no pixels bordering the growing regions are available.

52. Apparatus for segmenting an image, the image comprising a plurality of pixels, wherein said apparatus comprises:

means for allocating one or more pixels as seeds in the image;

means for growing regions of pixels from said seeds, wherein said growing means

5   comprises:

means for generating a list of pixels that border the growing regions;

scanning a number of said pixels of the list;

means for determining, for each said scanned pixel, a value indicative of the similarity of the luminance of said scanned pixel and the corresponding luminance of a

10 growing region that said scanned pixel borders;

means for selecting a pixel that has a minimum said value;

means for appending said selected pixel to said growing region it borders;

means for updating the said corresponding luminace of the appended region;

and

15 means for repeating the operations of the growing means until there are no more pixels that border the growing regions.

53. Apparatus for encoding an image having a number of segmented regions, the apparatus comprising:

20 means for splitting said image into a plurality of rectangular areas, wherein each rectangular area comprises a said region or part thereof forming a dominant portion of the rectangular area;

means for merging said rectangular areas which have a common said dominant portion and share a common edge; and

25 means for outputting the vertices of the merged rectangular areas as a representation of the segmented image.

54. Apparatus for segmenting an image, the image comprising a plurality of pixels and the apparatus comprising:

30 means for allocating one or more pixels as seeds;

means for growing regions from said seeds so as to segment the image into a number of regions;

means for storing the segmented image in a queue;

means for removing and selecting, until said queue is empty, the segmented image or a previously divided rectangular area of said segmented image currently stored first in the queue as the current rectangular area;

means for computing a value representative of the size of the dominant segmented region within said current area divided by the size of said current area;

means for storing the co-ordinates of the current area, if said value is greater than a predetermined threshold;

means for dividing said current area into a plurality of rectangular areas of said current area and adding the said plurality of rectangular areas to the queue, if said value is less than or equal to said predetermined threshold;

means for merging said divided rectangular areas which have a common dominant region and share a common edge; and

means for outputting the vertices of the merged rectangular areas as a representation of the segmented image.

55. Apparatus for segmenting an image, the image comprising a plurality of pixels, wherein said apparatus comprises:

means for distributing seeds in areas of said image as a function of a property of said pixels within those areas, wherein fewer seeds are allocated to those areas of the image having pixels homogeneous in said property; and

means for growing regions from said seeds so as to segment the image into a number of regions, wherein a number of pixels that border said growing regions are considered and that pixel of said number that is most similar in said property to a region it borders is appended to that region and the said property of the appended region is updated and said growing step is repeated until no pixels bordering the growing regions are available.

56. Apparatus for segmenting an image, the image comprising a plurality of pixels, wherein said apparatus comprises:

means for allocating pixels as seeds in areas of the image as a function of the luminance of the pixels within those areas, wherein fewer seeds are allocated to those areas of the image having pixels of homogeneous luminance and wherein said seeds form growing regions;

means for generating a list of pixels that border the growing regions;

means for scanning a number of said pixels of the list;

means for determining, for each said scanned pixel, a value indicative of the similarity of the luminance of said scanned pixel and the corresponding luminance of a growing region that said scanned pixel borders;

means for selecting a pixel that has a minimum said value;

means for appending said selected pixel to said growing region it borders;

means for updating the said corresponding luminace of the appended region; and

means for repeating the operations of the allocating means, generating means, scanning means, determining means, appending means, and updating means until there are no more pixels that border the growing regions.

57. A computer program product, including a computer readable medium having recorded thereon a computer program for seeding an image, the image comprising a plurality of pixels, wherein said computer program product comprises:

means for distributing seeds in areas of said image as a function of a property of said pixels within those areas, wherein fewer seeds are allocated to those areas of the image having pixels homogeneous in said property.

58. A computer program product, including a computer readable medium having recorded thereon a computer program for seeding an image having a plurality of pixels, the computer program product comprising:

means for dividing the image into one or more regions;

means for allocating, for each region, one or more seeds as a function of the contrast of said pixels within the region and the size of the region as compared to the size of the image, wherein fewer seeds are allocated to those regions of the image having pixels of homogeneous contrast; and

means for storing the pixel locations of each allocated seed.

59. A computer program product, including a computer readable medium having recorded thereon a computer program for seeding an image comprising a plurality of pixels, wherein said computer program product comprises:

means for selecting the image or a previously divided area of the image as the current area;

means for seeding the center of said current area when the contrast of the pixels and the size of current area meet a first predetermined condition;

means for subdividing said current area when the contrast of the pixels and the size of current area meet a second predetermined condition;

means for uniformly seeding said current area in a low density manner when the contrast of the pixels and the size of current area meet a third predetermined condition;

means for subdividing said current area when contrast of the pixels and the size of current area meet a fourth predetermined condition;

means for uniformly seeding said current area in a high density manner when the contrast of the pixels and the size of current area meet a fifth predetermined condition; and

means for repeating the operations of the selection and seeding means until all of said divided areas are seeded, wherein fewer seeds are allocated to those areas of the image having homogeneous contrast.

60.   A computer program product, including a computer readable medium having recorded thereon a computer program for segmenting an image, the image comprising a plurality of pixels, wherein said computer program product comprises:

means for allocating one or more pixels as seeds; and

means for growing regions from said seeds so as to segment the image into a number of regions, wherein a number of pixels that border said growing regions are considered and that pixel of said number that is most similar in a property to a region it borders is appended to that region and the said property of the appended region is updated and said growing step is repeated until no pixels bordering the growing regions are available.

61.   A computer program product, including a computer readable medium having recorded thereon a computer program for segmenting an image, the image comprising a plurality of pixels, wherein said computer program product comprises:

means for allocating one or more pixels as seeds in the image;

means for growing regions of pixels from said seeds, wherein said growing means comprises:

means for generating a list of pixels that border the growing regions;

scanning a number of said pixels of the list;

means for determining, for each said scanned pixel, a value indicative of the similarity of the luminance of said scanned pixel and the corresponding luminance of a growing region that said scanned pixel borders;

means for selecting a pixel that has a minimum said value;

means for appending said selected pixel to said growing region it borders;

means for updating the said corresponding luminace of the appended region; and

means for repeating the operations of the growing means until there are no more pixels that border the growing regions.

62.   A computer program product, including a computer readable medium having recorded thereon a computer program for encoding an image having a number of segmented regions, the computer program product comprising:

means for splitting said image into a plurality of rectangular areas, wherein each rectangular area comprises a said region or part thereof forming a dominant portion of the rectangular area;

means for merging said rectangular areas which have a common said dominant portion and share a common edge; and

means for outputting the vertices of the merged rectangular areas as a representation of the segmented image.

63.   A computer program product, including a computer readable medium having recorded thereon a computer program for segmenting an image, the image comprising a plurality of pixels and the computer program product comprising:

means for allocating one or more pixels as seeds;

means for growing regions from said seeds so as to segment the image into a number of regions;

means for storing the segmented image in a queue;

means for removing and selecting, until said queue is empty, the segmented image or a previously divided rectangular area of said segmented image currently stored first in the queue as the current rectangular area;

means for computing a value representative of the size of the dominant segmented region within said current area divided by the size of said current area;

means for storing the co-ordinates of the current area, if said value is greater than a predetermined threshold;

means for dividing said current area into a plurality of rectangular areas of said current area and adding the said plurality of rectangular areas to the queue, if said value is less than or equal to said predetermined threshold;

means for merging said divided rectangular areas which have a common dominant region and share a common edge; and

means for outputting the vertices of the merged rectangular areas as a representation of the segmented image.

64. A computer program product, including a computer readable medium having recorded thereon a computer program for segmenting an image, the image comprising a plurality of pixels, wherein said computer program product comprises:

means for distributing seeds in areas of said image as a function of a property of said pixels within those areas, wherein fewer seeds are allocated to those areas of the image having pixels homogeneous in said property; and

means for growing regions from said seeds so as to segment the image into a number of regions, wherein a number of pixels that border said growing regions are considered and that pixel of said number that is most similar in said property to a region it borders is appended to that region and the said property of the appended region is updated and said growing step is repeated until no pixels bordering the growing regions are available.

65. A computer program product, including a computer readable medium having recorded thereon a computer program for segmenting an image, the image comprising a plurality of pixels, wherein said computer program product comprises:

means for allocating pixels as seeds in areas of the image as a function of the luminance of the pixels within those areas, wherein fewer seeds are allocated to those areas of the image having pixels of homogeneous luminance and wherein said seeds form growing regions;

means for generating a list of pixels that border the growing regions;

means for scanning a number of said pixels of the list;

means for determining, for each said scanned pixel, a value indicative of the similarity of the luminance of said scanned pixel and the corresponding luminance of a growing region that said scanned pixel borders;

means for selecting a pixel that has a minimum said value;

means for appending said selected pixel to said growing region it borders;

means for updating the said corresponding luminace of the appended region; and

means for repeating the operations of the allocating means, generating means, scanning means, determining means, appending means, and updating means until there are no more pixels that border the growing regions.